DANIEL SETH SCHAFFER

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EMPLOYMENT HISTORY:

10/98 – CIRA, Fort Collins, Colorado
Administrative Professional: Developed the Scalable Modeling System (SMS) at the National Oceanographic and Atmospheric Administration's Forecast Systems Laboratory (FSL). SMS is a directive-based tool used to convert weather and ocean models to run efficiently on shared and distributed memory high performance computers. Designed, coded (C, Fortran 90, and Unix shell scripts) and tested the tool software. Used SMS to develop a parallel version of the FSL Rapid Update Cycle (RUC) weather forecast model currently producing daily forecasts for the National Weather Service. Also parallelized the Princeton Ocean Model (POM), the Hybrid Coordinate Ocean Model (HYCOM), the Regional Ocean Modeling System (ROMS) and others. Benchmarked and tuned performance of the parallel codes on machines such as the SGI Origin 2000, the IBM SP-2, the Cray T3E, and the FSL Alpha-Linux cluster. Developed a set of regression tests encompassing these and other codes so as to ensure stability of SMS releases. Provided support for modelers using SMS.

Leading development of a prototype NOAA computational grid. The grid will enable NOAA labs to seamlessly and securely share geographically and organizationally separated computational resources. Designed, coded, and tested a coupling implementation of the Weather Research and Forecast (WRF) I/O Application Programming Interface (API) using the Argonne National Laboratory Model Coupling Toolkit. Used this implementation to exchange surface boundary conditions between the WRF and ROMS models when they are coupled across a rudimentary version of the NOAA grid. ROMS runs on nodes at the Pacific Marine Environmental Laboratory (PMEL) in Seattle and WRF runs on nodes at FSL in Boulder. Demonstrated that the grid bandwidth and latency are such that this kind of loosely coupled modeling across the grid is feasible.

7/93 - 7/98 GSC/SAIC, LAUREL, MD
Senior Scientific Software Analyst: Designed, coded and tested a parallel FORTRAN 90 version of an atmospheric general circulation model (AGCM) using a horizontal data decomposition method. This AGCM was part of the NASA Goddard Earth Modeling System (GEMS) used in the NASA Seasonal to Interannual Prediction Project (NSIPP). Optimized single processor performance by improving vectorization on the Cray J90 and cache performance on the Cray T3E. Improved multi-processor performance by reducing communication times and eliminating other obstacles to scalability. Also designed, coded, and tested data structures, functions and subroutines included in the GEMS framework. Previous projects included parallelization of the GCM on a Cray J90 using micro-tasking directives and investigation of predictability of the El Nino /Southern Oscillation as simulated by the coupled GCM in the equatorial Tropical Pacific region.

9/90 - 6/93 DEPT. OF METEOROLOGY, UNIV. OF MD. COLLEGE PARK
Graduate Research Assistant: Investigated seasonal and inter-annual variability in tropical Atlantic Ocean heat storage and transport. Research based on ocean current and temperature predictions generated by assimilation of subsurface observations into an ocean model.

1/86 - 7/90 DANIEL H. WAGNER, ASSOC., SUNNYVALE CA
Senior Software Analyst: Project leader for testing of a large-scale computer model developed under sub-contract for Boeing, Inc. The software recommended and displayed search patterns used for detecting submarines from Navy P3 aircraft. The search algorithms were based on ocean wave propagation characteristics, results of prior searches, and known on-board equipment detection capabilities. The model was coded in Ada using military standards for structured software development and testing. Supervised planning and execution of the tests. Briefed client on testing progress. Designed and coded search planning algorithms. Designed, coded, tested and delivered to the client various other small-scale computerized search programs. Also responsible for system administration of a network of Sun and HP workstations. Maintained and upgraded system hardware and software.

EDUCATION:

University of Maryland, College Park
M.S. Meteorology, December 1992

University of California, Berkeley
B.A. Applied Mathematics and Computer Science, 1983

SPECIAL SKILLS:

Computer Languages: FORTRAN 90, C++, Java, Ada, Pascal
Hardware Platforms: Intel Linux Cluster, Cray J90, Cray T3E, SUN, DEC Alpha, IBM SP, SGI Origin 3000

AWARDS: CIRA Research Initiative Award (2001)

PUBLICATIONS:

D. Schaffer, M. Govett, J. Middlecoff, T. Henderson, Performance Analysis of the Scalable Modeling System, *Submitted to Proceedings of the Tenth ECMWF Workshop on the Use of High Performance Computing in Meteorology* (2004).

M. Govett, J. Middlecoff, L. Hart, T. Henderson, D. Schaffer, The Scalable Modeling System: Directive-Based Code Parallelization for Distributed and Shared Memory Computers, *Journal of Parallel Computing,* **29** (2002), 95-1020.

D. Schaffer and M.J. Suarez, Design and performance analysis of a massively parallel atmospheric general circulation model, *J. Scientific Programming*, **8** (2000), 49-57.

REFERENCES:

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